



# Elwood High Performance Motors

*SX-Series Application Note:  
Hiperface DSL Feedback*

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## 1. Overview

This document provides recommendations for installing Elwood High Performance Motors SX-Series (explosion proof) motors with a Sick/Stegmann Hiperface DSL® Multi-turn (EKM36) encoder to a Rockwell Kinetix® 5500 or 5700 drive.

Contact Elwood with additional motor installation questions at 262-637-6591. Additional resources to accompany this application note:

SX-Series web page:

<http://www.elwood.com/sx>

Specific Information for Rockwell Automation users and distributors:

[http://www.elwood.com/sx\\_rockwell.html](http://www.elwood.com/sx_rockwell.html)

SX-Series frequently asked questions:

[http://www.elwood.com/dSX-Series\\_FAQ\\_Elwood.pdf](http://www.elwood.com/dSX-Series_FAQ_Elwood.pdf)

SX-Series manual:

<http://www.elwood.com/edn/033300.pdf>

SX-Series startup and installation recommendations:

[http://www.elwood.com/sx\\_install.html](http://www.elwood.com/sx_install.html)

## 2. Cable

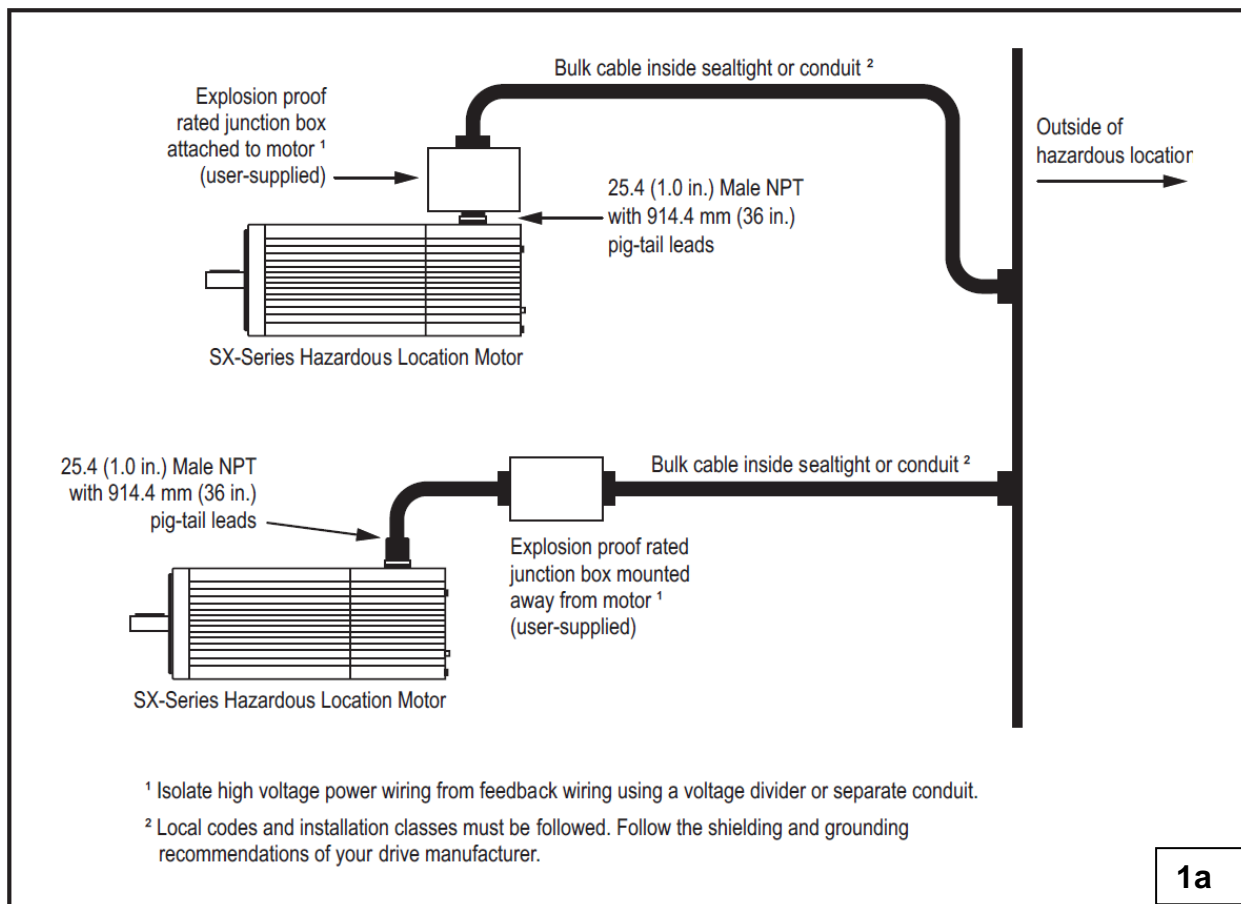
SX-Series “explosion-proof” brushless servo motors have been tested and are sealed with appropriately rated explosion-proof cement. This type of construction prevents hazardous gas, vapors, or sparks from passing through the cable/conductor exit. SX-Series motors do not include typical connectors or terminals for connection. Rather, the motors include 3-foot long individual flying leads.

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Proper installation must follow all applicable (local/state/national) standards, codes, and regulations. Typically, sealed rigid conduit or an appropriately rated junction box is fitted to the motor (see image 1a below). The motor's individual flying leads are extended to the control enclosure through connections made within the junction box.

**NOTE:** An additional pair of wires must be included to carry the Over Temperature Limit signal back to the control logic circuit. For non-brake motors specify brake cable and use the additional pair. For brake motors contact Elwood for custom cable pricing. See more notes on the OTL signal and safety circuit in the “Connections and Wiring” segment of this document.



The motor's flying leads should be extended with approved “hybrid” DSL servo cable. Such cable can be supplied by Elwood or appropriately sized 2090-CSxM1DF-xxAAxx



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cable from Rockwell Automation is acceptable. For more information on DSL Cables please reference the link below to a SICK Hiperface DSL cable application note.

<https://goo.gl/qqsSJv>

Various connection methods can be used to join the motor's flying leads with the DSL extension cable. Various connection methods include...

- Wago Lever Nut (<http://www.wago.us/wago/press/press-releases/overview/detail-1122.jsp>)
- Closed End Crimp Caps
- Butt Splice
- Soldered in line splice

### 3. Connections and Wiring

Proper wiring and shielding connections between the motor and drive are critical to the operation of the motion system. While DSL technology allows both the motor power and feedback signal to be passed through a single cable, following best practices for installation and noise mitigation is still critical. Follow Rockwell Automation guidelines for installation of servo systems as outlined in the following documents.

[http://www.elwood.com/dRA\\_EMI\\_Servo.pdf](http://www.elwood.com/dRA_EMI_Servo.pdf)

[http://www.elwood.com/dRA\\_EMI\\_ACDrive.pdf](http://www.elwood.com/dRA_EMI_ACDrive.pdf)

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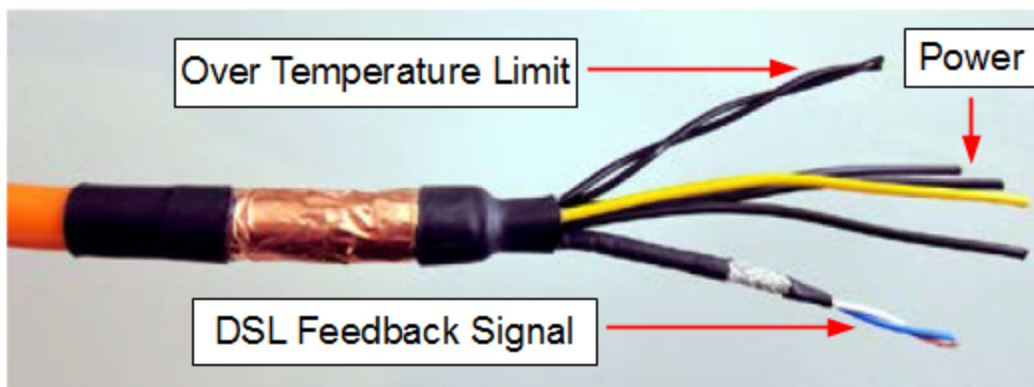
### a. Cable termination (motor end)

Once the DSL cable is prepared, connections can be made to the flying leads of the motor.



### b. Cable preparation (drive end)

As outlined in the SICK application note, the DSL cable should be stripped to separate the power and feedback wires as follows.



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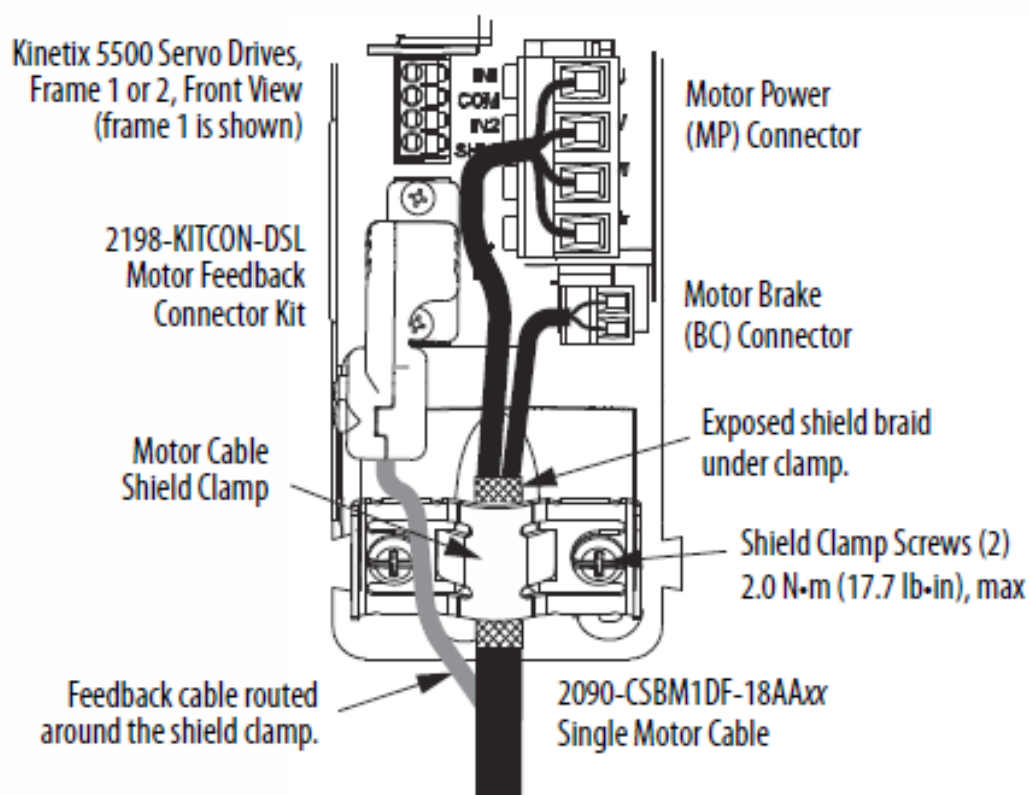
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### c. Cable Shield Clamp

At the drive end the DSL cable should be stripped appropriately with the overall shield clamped on the drive. See examples below for Kinetix 5500 and 5700 drives.

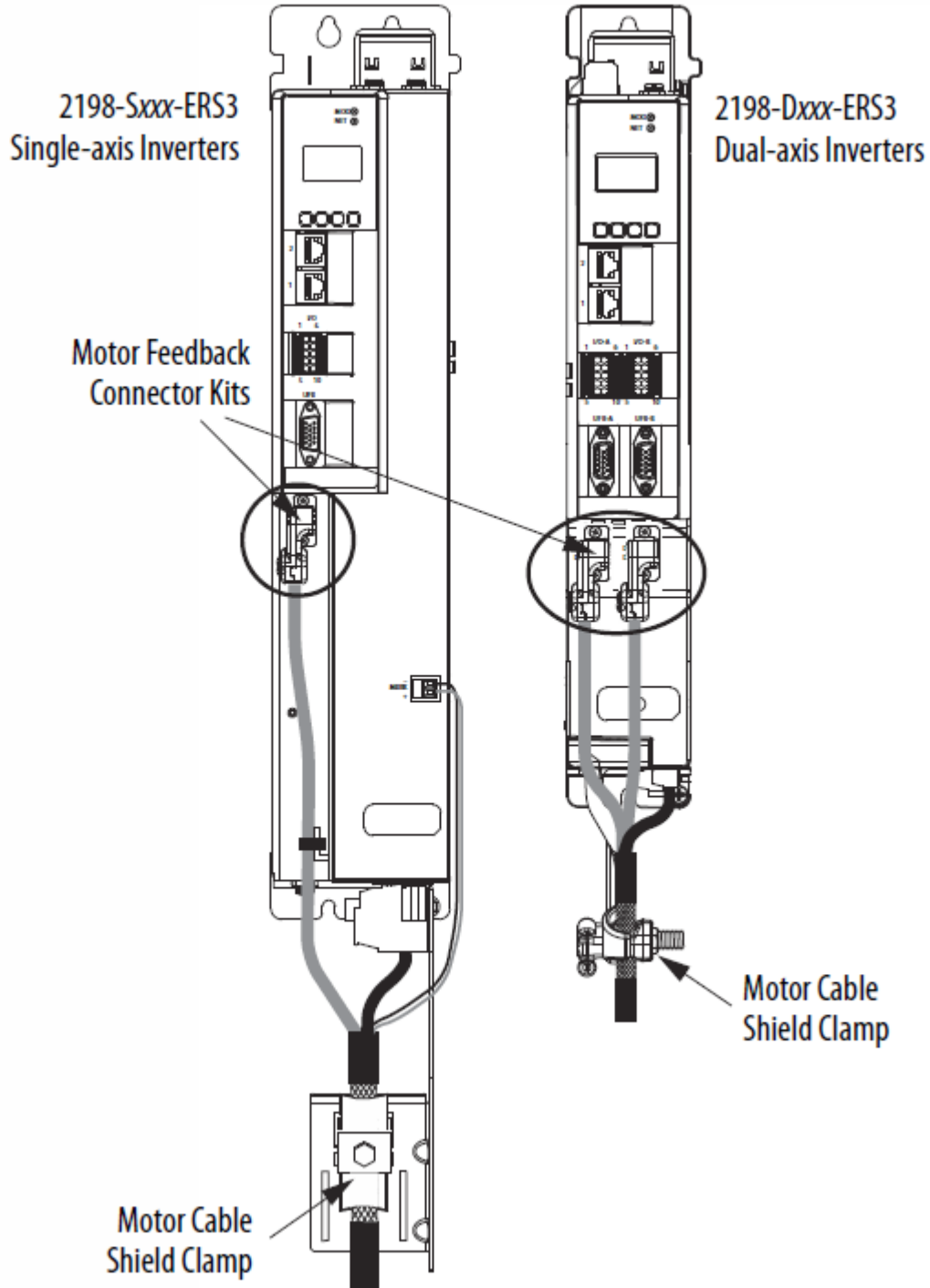
### Cable Shield Clamp Installation



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### d. Power, Brake, and Thermal Wiring

The motor power, brake, and OTL wires should be wired to the drive using the convention listed in the following table.

## Wiring the Power Connections

Kinetix Drive	Elwood SX-Series Power	
Terminal	Wire Color	Signal
U	Black	Phase A
V	Red	Phase C
W	White	Phase B
Ground	Green	Ground
MBRK-	Orange	Brake - Com
MBRK+	Brown	Brake +24V DC
Safety Circuit <sup>1</sup>	Blue	Over Temp
Safety Circuit <sup>1</sup>	Blue	Over Temp

(1) See notes below on safety circuit requirements.

The Elwood "SX" Series motors have over temperature limit (OTL) sensors connected in a series electrical path in of the three phase windings. One is also supplied on the brake in series with the windings if the brake option is ordered.

Any of the OTL's will mechanically open if its motor winding or brake over heats, thus opening the OTL series circuit path to the amplifier. The amplifier used to drive an SX-Series motor should require a manual reset of the system after inspection of the entire machine, motor, and drive electronics for possible causes of overheating.

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**The motor OTL is an automatic resetting device and should be connected directly into a power disabling or latched (locked-out) type circuit that requires manual resetting.**

**Do not override the OTL sensors from the amplifiers,** caution must be observed when applying these motors to machinery to prevent possible accidental injury that could result when the thermal overload device automatically resets allowing the motor to restart.

Elwood recommends using safety rated I/O to disable power to the motor.

### e. Hiperface DSL Wiring/Connector

Feedback connections to the drive are made through the Rockwell 2198-KITCON-DSL connector. The wiring convention is listed in the table below. The images that follow outline how to wire the KITCON connector along with displaying a working example.

### Feedback (2-pin) Connector Plug

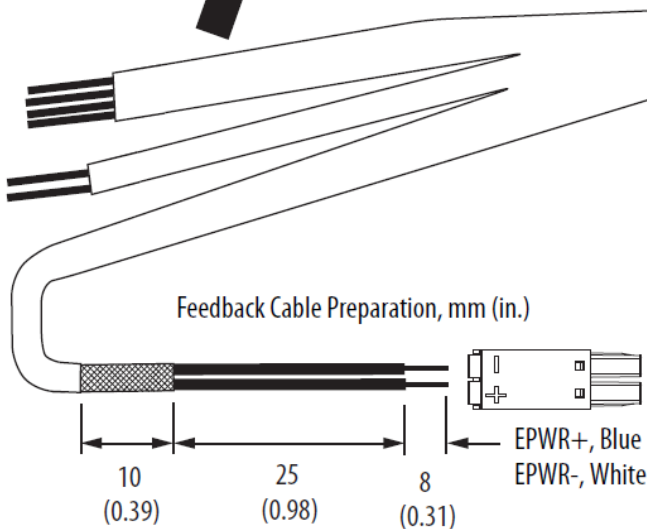
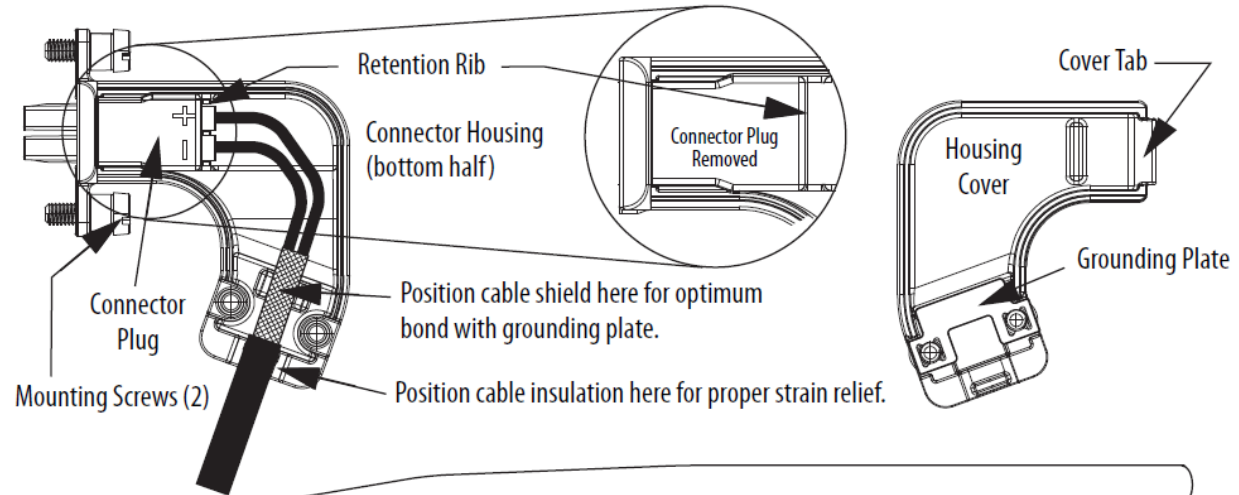
Drive Pin	Kit Pin	Signal	Wire Label	Elwood SX Wire Color
MF-1	1	D+	EPWR+	Gray
MF-2	2	D-	EPWR-	White



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### Install the Feedback Connector Kit



Follow these steps to assemble the connector kit.

1. Insert wires into plug (observe polarity).
2. Position connector plug as shown.
3. Align braided shield as shown to maximize contact for high-frequency bond.
4. Align outer insulation of feedback cable as shown for proper strain relief.
5. Fit cover tab into bottom-half mating feature, keeping the plug pushed forward past retention rib as the cover is closed.

6. Tighten cover screws to recommended torque. Cover should close with no gaps.

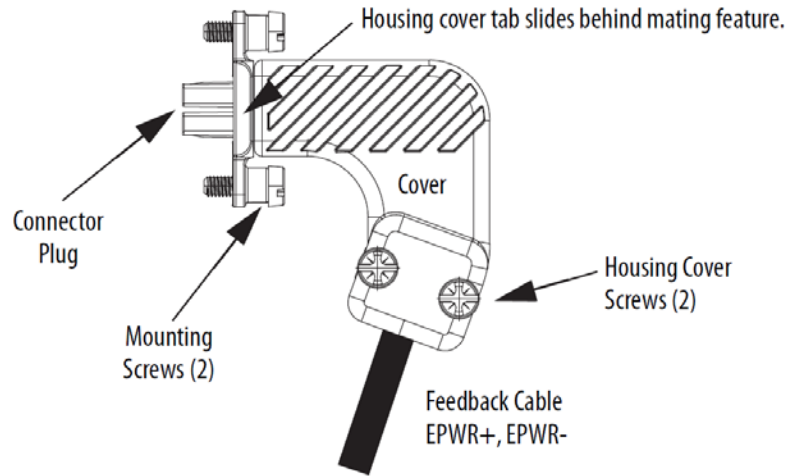
Pressure on the end of connector plug should not push plug back into connector housing.

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### Connector Plug Installed and Housing Assembled





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### **4. CMF Files**

If the motor file for the appropriate Elwood SX model number is not found in your database, a CMF (Custom Motor File) can be downloaded at the following link. Please note that the installation tool is also included in the zip file. Restart Studio/Logix 5000 after the new CMF file is installed to refresh the database.

<http://www.elwood.com/cmf/elwoodcmf.zip>